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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.                       | CONFIRMATION NO.                   |
|--|-------------|----------------------|---|------------------------------------|
| 10/628,842   | 07/28/2003  | Bhabendra Pradhan    | A03092US (15630.141)                      | 5824                               |
| <div>22920      7590      08/20/2007<br/>GARVEY SMITH NEHRBASS &amp; NORTH, LLC<br/>LAKEWAY 3, SUITE 3290<br/>3838 NORTH CAUSEWAY BLVD.<br/>METAIRIE, LA 70002</div> |             |                      |   |                                    |
|  |             |                      | <div>EXAMINER<br/>MCCRACKEN, DANIEL</div> |                                    |
|  |             |                      | <div>ART UNIT<br/>1754</div>              | <div>PAPER NUMBER</div>            |
|  |             |                      | <div>MAIL DATE<br/>08/20/2007</div>       | <div>DELIVERY MODE<br/>PAPER</div> |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |  |   |  |
|------------------------------|--|---|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/628,842   | <b>Applicant(s)</b><br>PRADHAN, BHABENDRA |  |
|                              | <b>Examiner</b><br>Daniel C. McCracken | <b>Art Unit</b><br>1754                   |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 May 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10, 20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10, 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

Citation to the Specification will be in the following format (S. # : L) where # denotes the page number and L denotes the line number. Citation to patent literature will be in the form (Inventor # : LL) where # is the column number and LL is the line number. Citation to the pre-grant publication literature will be in the following format (Inventor # : ¶) where # denotes the page number and ¶ denotes the paragraph number.

#### ***Response to Arguments***

Finality of the Office Action dated 1/10/2006 is hereby withdrawn. Applicant's arguments with respect to all claims have been considered but are moot in view of the new ground(s) of rejection.

#### ***Specification***

The disclosure is objected to because of the following informalities: It would appear as if spaces were omitted at several locations throughout the Specification. *See e.g.* (S. 3: 18) ("200gcarbon") *and* (S. 4: 12) ("200gcarbon/g"). A thorough and thoughtful review of the Specification to correct similar deficiencies is requested. Appropriate correction is required.

#### ***Claim Objections***

Claims 1 and 7 are objected to because of the following informalities: It would appear as if a superscript "2" should replace the "2" found in "limitation a" of both Claims. Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 5-7, 9 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

All claims recite either " $\geq$ " or " $\leq$ ." At best, this notation is redundant, at worst, it is indefinite. The operators " $\geq$ " and " $\leq$ " by themselves are sufficient.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

The references cited teach each and every limitation of the rejected claims. The pinpoint citations provided are in no way to be construed as limitations of the teachings of the reference, but rather illustrative of particular instances where the teachings may be found.

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Claims 1-10 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants admissions in view of US 6,132,653 to Hunt, et al., Krishnankutty, et al., *The effect of copper on the structural characteristics of carbon filaments produced from iron catalyzed decomposition of ethylene*, Catalysis Today 1997; 37: 295 (hereinafter "Krishnankutty at \_\_\_"), and Rodriguez, et al., *Catalytic Engineering of Carbon Nanostructures*, Langmuir 1995; 11: 3862 (hereinafter "Rodriguez at \_\_\_").

At the outset, the Examiner notes that "a statement by an applicant during prosecution identifying certain matter not the work of the inventor as "prior art" is an admission that the matter is prior art." *Riverwood Int'l Corp. v. R.A. Jones & Co.*, 324 F.3d 1346, 1354, 66 USPQ2d 1331, 1337 (Fed. Cir. 2003) (citations omitted). At (S. 3: 18-22), Applicants have stated "*The catalysts which are key to the products and yield achieved are prepared to specific parameters (size distribution, composition and crystallinity) specified and via a flame synthesis process as taught in U.S. Patent No. 6,132,653.*" (emphasis added). Thus, the catalyst of the instant process as recited in the claims is admittedly old and known. All limitations of the pending claims related to the catalyst and its physical properties are being treated as old and known.

With respect to all other limitations found in the Claims, the Examiner is taking official notice that the catalytic decomposition of hydrocarbons to make "nanocarbon materials" is old and known. In support of taking official notice, the Examiner cites to Krishnankutty as but one example of this catalytic decomposition technique. Other examples of these teachings may be found in the patent and non-patent literature cited in Applicants' IDS filed 10/31/2003. Krishnankutty is cited because, like the instant claims, Krishnankutty recites the reaction of *unsupported iron-copper powders* at the claimed temperature ranges. *Compare* (Krishnankutty "Abstract") ("Carbon filaments were produced by the decomposition of ethylene over

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unsupported iron-copper powders in the presence of varying amounts of hydrogen at temperatures ranging from 500°C to 800°C.”) *with* “Claims 1 & 7” (noting the use of an unsupported catalyst), “Claims 2 & 10” (noting the use of an iron-copper alloy), *and* “Claim 8” (noting a reaction temperature not to exceed 550°C).

To the extent that Krishnankutty may not recite *in haec verba* the admittedly old catalyst recited by Hunt, one would be motivated to combine the catalyst of Hunt with a catalytic decomposition technique for any number of reasons. For example, as noted below, the work of Rodriguez et al provides a thorough, but by no means exhaustive treatment of the effect of the catalyst on the resultant nanostructures. Rodriguez states, *inter alia*:

A common feature of all these growth structures is that *the width of the nanofiber is determined by the size of the associated catalyst particle.*

...

*The alignment and crystalline perfection of the platelets is a parameter that is governed by the nature and shape of the catalyst particle and orientation of the precipitating faces*

(Rodriguez at 3864, Col. 1) (emphasis added). Hunt in turn recites the ability to control both size and crystallinity of the catalysts generated. *See* (Hunt 6: 19 *et seq.*) (noting the ability to control the particle/catalyst size) *and* (Hunt 22: 5) (noting the creation of a catalyst with a specified crystallinity).

With respect to the limitations related to “morphological selectivity,” Applicants are claiming that which has been described by N.M. Rodriguez, R.T.K. Baker and coworkers:

In recent years, catalysts have been employed to engineer the conformation and crystalline perfection of carbon fibers and tubular structures of nanosized dimensions. Using this approach, it is possible to generate carbon nanofibers in an assortment of growth conformations, which include straight, branched, helical, and coiled forms. It is now recognized that metal catalysts can have a tremendous impact on the control of the growth

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characteristics of carbon nanofibers. The advantages of this catalytic route are that these types of materials can be produced at moderate temperatures as well as low cost and their structures can be tailored by the selection of a given metal. Furthermore, the conformation can be modified by the presence of a second metal in the catalyst or by pretreatments that result in the incorporation of certain nonmetallic elements into the active particle.

(Rodriguez at 3862) (Col. 1, footnoted omitted).

With respect to all limitations related to "yield" and "purity," it is expected that Hunt in view of the teachings of Krishnankutty and Rodriguez would necessarily arrived at the claimed yield and purity, due to the fact that the same process conditions and catalyst is being used.


### *Conclusion*

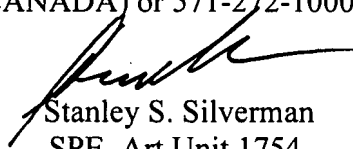
All amendments made in response to this Office Action must be accompanied by a pinpoint citation to the Specification (i.e. page and paragraph or line number) to indicate where Applicants are drawing their support.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel C. McCracken whose telephone number is (571) 272-6537. The examiner can normally be reached on Monday through Friday, 9 AM - 6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
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SPE, Art Unit 1754